PATENT SPECIFICATION

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DRAWINGS ATTACHED

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(72) Inventor ALAN WILLIAM RONALD PODMORE

(54) ELECTRICAL CONNECTORS

(71) We, AMP INCORPORATED, a corporation organised and existing under the laws of the State of New Jersey, United States of America, of Eisenhower Boulevard, Harrisburg, Pennsylvania, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention is concerned with electrical connectors for flat cable, for example so-called "ribbon or tape cable" in which laminae of synthetic resin insulation are bonded to copper strip conductors arranged in generally parallel spaced co-planar relation.

An electrical connector for flat cable, according to the invention, comprises a block having a plurality of contact-receiving parallel passageways extending between opposite faces of the block, adjacent passageways being interconnected by a slot transverse to the passageways and extending inwardly of the block from one of the faces for receiving an end portion of the flat cable, each passageway having a wall formed with a ramp, an electrical contact having a pair of spaced resilient contact arms formed with tangs received in each passageway and movable axially of the passageway so that on movement past the ramp, the contact arms are moved together for making electrical engagement with opposite surfaces of a conductive strip of the flat cable, and means for limiting axial movement of the electrical contact in the passageway.

Preferably, the contact has lateral extensions to be received in lateral slots formed in opposite side walls of the passageway to hold the contact in the desired position.

The invention will be described, by way of example only, with reference to sheet 1 of the drawings accompanying the provisional specification, in which:—

Figures 1 and 2 are perspective views, partly in section, of electrical connectors and contacts therefor.

The electrical connector of Figure 1 comprises a block 1 formed of dielectric material, for example polycarbonate. Generally parallel contact-receiving passageways 2 extend between opposed faces of the block. The floor 3 of each passageway 2 is generally planar, and the roof 4 is inclined from a forward end of the passageway having a large opening, the right hand end as shown, to the rearward end where the opening is smaller, to form a ramp surface. A shoulder 5 is formed just short of the rearward end. Adjacent passageways 2 are interconnected by a slot 6 formed in the walls of the passageways just above the floor 3, and the slot 6 is dimensioned to receive an end portion of a flat cable, not shown. The slot 6 extends slightly beyond the outermost passageways 2 to receive the peripheral insulation of the flat cable. Adjacent passageways are spaced apart the distance separating adjacent conductive strips of the cable. A contact 7 is formed from a blank of electrically conductive material to have a forward contact portion including a pair of spaced resilient arms 8, 10 and a wire-receiving portion 9. The blank has a lateral extension extending forwardly from about the mid-point of the blank, and the extension is folded over the forward portion of the blank to abut the blank at its mid-point and then inclined upwardly away from the blank in parallel spaced relation to the arm 8 to define the arm 10. Tangs 11 are struck from the arm 8 and the arm 10 towards each other.

In use, a wire end is crimped or otherwise secured to the wire-receiving portion 9 of the contact 7. A contact 7 so connected is then inserted into each passageway 2, wire-receiving portion 9 leading, until the contact 7 lies between the ends of the passageway, with the underside of the arm 8 resting on the floor 3. A flat or ribbon cable, not shown, having an insulation of polyvinyl chloride, Mylar (Registered Trade Mark) or other synthetic resin, is then inserted into the slot 6 and moved towards the contacts 7 in the passageways 2 between arms 8 and 10, the tangs 11 gripping the cable. Each contact 7 is then moved inwardly of the passageway 2 urging the arm 10 towards the arm 8 because of

[*Price 25p*]

the inward slope of the roof 4, causing the tangs 11 to bite through the cable insulation and electrically to engage top and bottom surfaces of a conductive strip. The wire-receiving portion 9 abuts the shoulder 5, so limiting the extent of inward movement of the contact 7.

The electrical connector of Figure 2 comprises an insulating block 12 having contact-receiving passageways 13 extending in generally parallel relation between opposed faces of the block 12. Adjacent passageways are spaced apart by the distance separating conductive strips of a flat cable, not shown. Each passageway 13 is generally Y-shape as seen in longitudinal section, having a relatively large forward opening 14 and a smaller rearward opening 15. An inwardly directed dead-ended slot 16 is cut in each side of the forward opening 14 of each passageway. The slots 16 receive the tabs 23 of a contact 18 which, in the fully mated position and as explained below, abut the dead end of the slot 16. Another slot 17 is cut inwardly from the sides of the rearward opening 15 and the slot 17 interconnects adjacent passageways and extends slightly beyond the outermost passageways, to receive an end portion of ribbon cable, not shown. The floor and roof of each passageway 13 are each cut with a forward planar portion, an intermediate inwardly directed ramp portion and a rearward portion. The rearward portion of the floor is formed with shoulder 19 at the junction with the floor ramp portion, and that of the roof is formed with a shoulder 20 at the junction with the roof ramp portion which extends further rearwardly than the floor ramp portion and at a gentler angle.

The contact 18 is formed from a blank of electrically conductive metal and comprises a forward contact portion 21 and a rearward tab portion 22, these parts being separated by laterally extending ears 23. The forward portion 21 has two spaced elongate arms joined at their rearward ends and the sides of which are inclined normal to the base and formed with marginal serrations 24. Each forward portion has a leading edge 24*a*, and a latch 21*a* struck outwardly of the forward portion.

In use, a contact 18 is passed partially into each passageway 13 from the forward end 14, edge 24*a* of the contact 18 leading, until the lower latch 21*a* (not shown) engages the shoulder 19. An end portion of a flat or ribbon cable, not shown, is received in the slot 17 and as the cable is moved inwardly of the passageways, the serrations 24 of each contact 18 lightly grip the cable. The contacts are then moved inwardly of the passageway 13 to abut the ears 23 against the dead end of the slot 16, causing the upper latch 21*a* of the contact 18 to ride over and latch behind the shoulder 20 so causing the serrations 24 to bite through the insulation to contact the conductive strips or cores.

The electrical connectors of this invention may be used for flexible printed circuits, and for tape cable, as well as ribbon cable.

WHAT WE CLAIM IS:—

1. An electrical connector for a flat cable comprising a block having a plurality of contact-receiving parallel passageways extending between opposite faces of the block, adjacent passageways being interconnected by a slot transverse to the passageways and extending inwardly of the block from one of the faces for receiving an end portion of the flat cable, each passageway having a wall formed with a ramp, an electrical contact having a pair of spaced resilient contact arms formed with tangs received in each passageway and movable axially of the passageway so that on movement past the ramp, the contact arms are moved together for making electrical engagement with opposite surfaces of a conductive strip of the flat cable, and means for limiting axial movement of the electrical contact in the passageway.

2. A connector as claimed in claim 1, in which the electrical contact has lateral retaining extensions which extensions are received in lateral slots formed in opposite side walls of the passageway.

3. An electrical connector for flat cable, constructed and arranged substantially as described with reference to and as illustrated in Figures 1 or 2 of the drawings accompanying the provisional specification.

For the Applicants:
R. G. STUART-PRINCE,
Chartered Patent Agent.

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1261123 PROVISIONAL SPECIFICATION

2 SHEETS *This drawing is a reproduction of the Original on a reduced scale*

Sheet 2

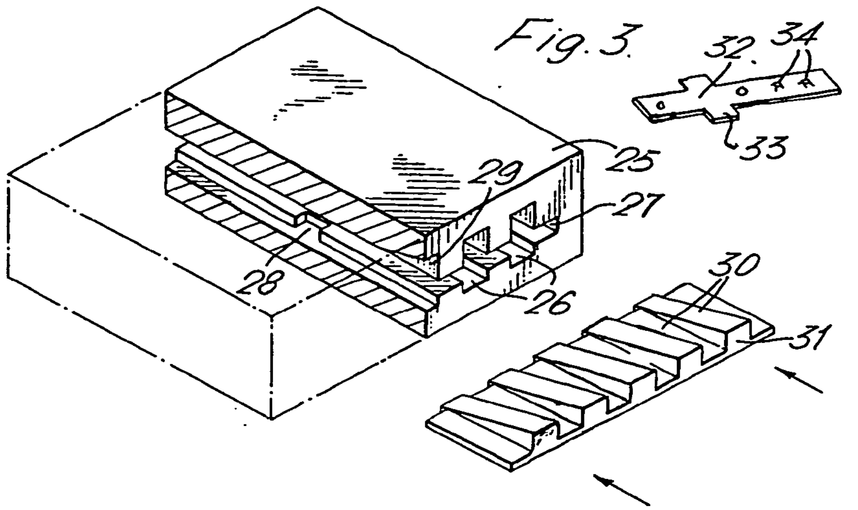

Fig. 3.

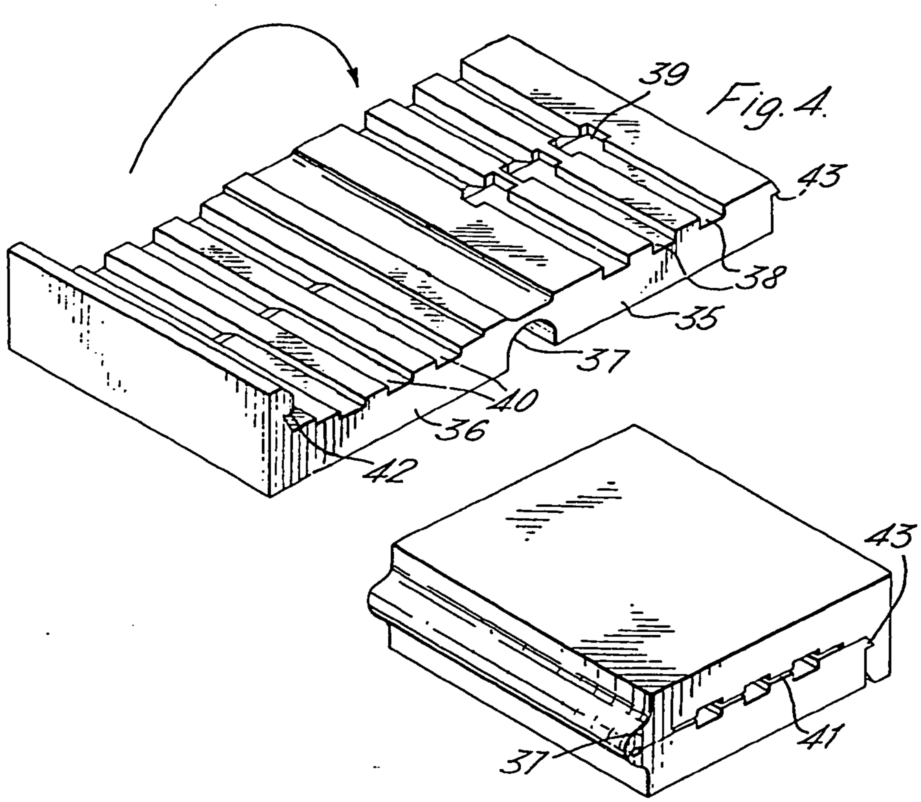

Fig. 4.

1261123 PROVISIONAL SPECIFICATION
2 SHEETS *This drawing is a reproduction of the Original on a reduced scale*
Sheet 1

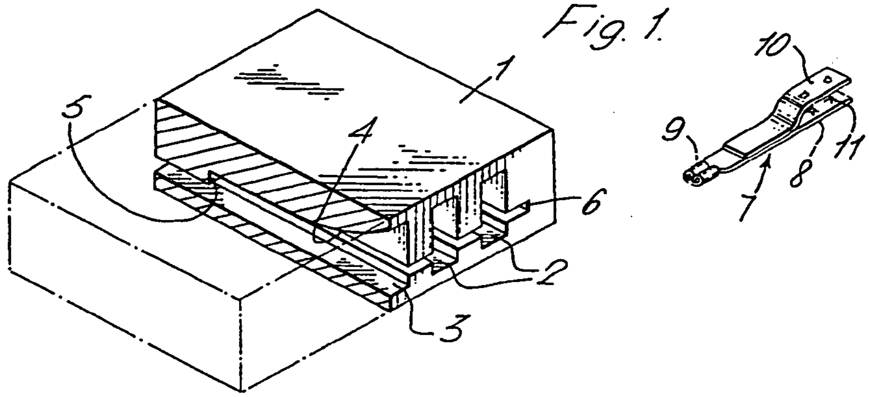

Fig. 1.

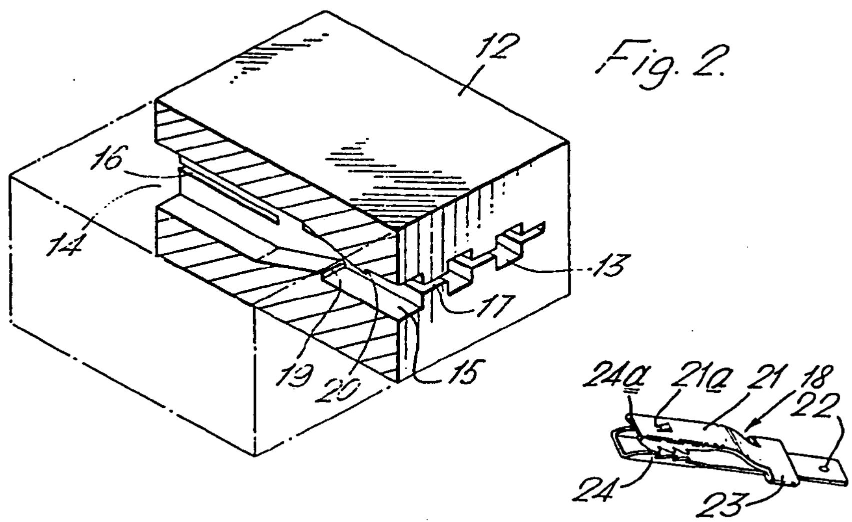

Fig. 2.